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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/975,682	10/11/2001	Gang Huang	117.0015	9461

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EXAMINER	
KIM, KEVIN	

ART UNIT	PAPER NUMBER
2611	

DATE MAILED: 08/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/975,682	HUANG, GANG	
	Examiner	Art Unit	
	Kevin Y. Kim	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 June 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,7,9,11,13 and 23-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,9,11,13,23-29,31-33* is/are rejected.

7)☒ Claim(s) *7 and 30* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-5,7,9,11,13,23-33 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Applicant amended claims 1 and 23, and added new claim 24 such that the claimed subject matter now includes "a second pre-coding matrix at the receiver" that is used along with the transmitted first pre-coded training signal to generate the matrix updating information. However, the originally filed specification fails to disclose such a second pre-coding matrix at the receiver for the recited purpose or for any other purposes. The specification simply describes the information regarding error between the transmitted pre-coded signal and an expected symbol stream is transmitted back to the transmitter to update the pre-coding matrix at the transmitter. See page 18, lines 12-22.

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 102

4. Claims 1-3,9,11,23-26,29,31 and 32 are rejected under 35 U.S.C. 102(e) as being anticipated by Nordstrom et al (US 2001/0004383 previously cited).

Claims 1,23 and 24.

Nordstrom et al discloses a method and apparatus for reducing cross-talk in a communications system comprising a plurality of transmitters for transmitting encoded data signals via respective communications channels (see Abstract) to a plurality of receivers and receiving back matrix updating information, comprising:

processing encoded data signals in a transmitter utilizing an initial pre-coding matrix to produce a first pre-coded signal (see Fig.3, paragraph [0033]) ,

transmitting said first pre-coded signal on a respective first communication channel,

receiving the matrix updating information computed at a receiver wherein the matrix updating information is computed using the transmitted first pre-coded data signals and a second pre-coding matrix in each receiver (see paragraph [0036] and [0037], and note that the expected signal $\hat{S}_k$ provided at the receiver reads on "a second pre-coding matrix in each receiver,") and

updating the pre-coding matrix based on matrix updating information, whereby the updating tends to offset channel impairments within said first communication channel.

Nordstrom et al does not mention the pre-coded data signals are training signals. However, in order to compute the error the expected data of the transmitted signal should have been known at the receiver. The equation at col.3, line 4 shows computation of error between

the received signal R_k and the expected signal $\hat{S}_k$. In other words, the predetermined data signal, commonly known as a training signal, is transmitted at least initially so that the receiver can compute the error. Thus, the received signal Rk reads on a training signal.

Claims 2 and 25.

Nordstrom et al discloses receiving said first pre-coded signal from said first communications channel; and generating said impairment indicative signal in response to a determination of a channel impairment level, i.e., error, of said first communications channel. See paragraph [0036].

Claims 3 and 26.

Nordstrom et al discloses a least mean square (LMS) algorithm. See paragraph [0036].

Claims 9 and 32.

Nordstrom et al discloses that each of said N transmitters processes an encoded data signal utilizing a pre-coding matrix, each pre-coding matrix processing encoded data signals from the other transmitters. See Fig.2.

Claim 11.

Nordstrom et al further discloses that each of the N transmitters performs the step of selecting, as initial parameters for its respective pre-coding matrix prior to processing a respective encoded data signal, said selected initial parameters tending to offset channel impairments of the respective communication channels,

Claim 29.

The equation at col.3, line 4 shows computation of error between the received signal R_k and the expected signal $\hat{S}_k$.

Claim 31.

The expected signal $\hat{S}_k$ provided at the receiver reads on "a first pre-coding matrix in each receiver."

Claim Rejections - 35 USC § 103

5. Claims 4,5,27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nordstrom, as applied to claims 1 and 24 above, in view of Timm et al. (US 6,055,268 previously cited).

Nordstrom discloses all the subject matter claimed but does not particularly teach a CAP signal or QAM signal. However, it is well known in the art that a DSL system may use a CAP signal or QAM signal. Timm teach a DSL system may use DMT, QAM or Cap signals (col. 3, lines 61-62 and 66-67). Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a CAP signal or a QAM signal in the DSL system of Nordstrom since the use of a CAP signal or a QAM signal in a DSL system involves only routine skill in the art.

6. Claim 13 and 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nordstrom, as applied to claims 6 and 24 above, in view of Schneider et al (US 6,314,135 previously cited).

Nordstrom discloses all the subject matter claimed for training an equalizer to reduce channel-specific impairments from the training sequence prior to selecting the initial matrix parameters.

Schneider et al teaches an equalizer to compensate channel impairments using a training sequence. See Fig.4 and related descriptions. Thus, it would have been obvious to one skilled in the art at the time the invention was made to provide an equalizer and training it o compensate channel impairments in the communication system of Nordstrom, as taught by Schneider et al.

Allowable Subject Matter

7. Claims 7, 8 and 30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Y. Kim whose telephone number is 571-272-3039. The examiner can normally be reached on 8AM --5PM M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

August 14, 2006

AU 2611

KEVIN KIM
PATENT EXAMINER